

Technical Reviewers' Rating Summary

Proposal Number	G-40-01
Application Title	Refrac Pilot
Submitted By	Whiting Petroleum Corporation
Request For	\$600,000.00
Total Project Costs	\$1,300,000.00

Section A. Scoring

Statement	Weight	G-40-01A	G-40-02B	G-40-01C	Avg. Score
1. Objectives	9	3	4	3	30
2. Achievability	7	2	4	3	21
3. Methodology	8	3	4	2	24
4. Contribution	8	3	4	5	32
5. Awareness / Background	5	3	4	3	16
6. Project Management	3	3	4	3	10
7. Equipment / Facilities	2	3	5	3	7
8. Value / Industry - Budget	4	3	4	3	13
9. Financial Match - Budget	4	3	3	3	12
Avg. Weighted Score		143	198	158	166
OVERALL					
FUND			X		
TO BE CONSIDERED		X			
DO NOT FUND				X	

Section B. Ratings and Comments

1. The objectives or goals of the proposed project with respect to clarity and consistency with North Dakota Industrial Commission/Oil and Gas Research Council goals are:
“Research purpose of project is straightforward. There is a clear need for more dedicated research in re-stimulation of hydraulically fractured formations.”
- Reviewer: G-40-01A
- Rating: 3 (Clear)
“Thank you for the feedback.”
- Applicant
“The project aligns extremely well with OGRP's goals and objectives.”
- Reviewer: G-40-02B
- Rating: 4 (Very Clear)
“Thank you for the feedback.”
- Applicant
“
- Reviewer: G-40-01C
- Rating: 3 (Clear)
“Thank you for the feedback.”
- Applicant

2. With the approach suggested and time and budget available, the objectives are:
“I suspect that fracturing design, wellbore cleanout, and artificial lift method, may require different approach, resulting in a higher project cost to the operator.”
- *Reviewer: G-40-01A*
- *Rating: 2 (Possibly Achievable)*
“Thank you for the feedback. I look forward to providing more details regarding the clean-out in person.”
- *Applicant*
“The approach of partnering into a planned Bakken refrac by an industry leader heightens the likelihood of achieving project goals within timeframe and budget.”
- *Reviewer: G-40-02B*
- *Rating: 4 (Most Likely Achievable)*
“Thank you for the feedback. I look forward to providing more details regarding the clean-out in person.”
- *Applicant*
“”
- *Reviewer: G-40-01C*
- *Rating: 3 (Likely Achievable)*
“Thank you for the feedback. I look forward to providing more details regarding the clean-out in person.”
- *Applicant*

3. The quality of the methodology displayed in the proposal is:

“The wellbore candidate vetting process and re-fracturing procedure is typical of most recent attempts. It will evaluate a generally accepted re-fracturing process for the Bakken, but doesn't appear to involve the development of any new technologies. The re-fracturing procedure doesn't elaborate on critical items like fracturing fluid and proppant types, wellbore cleanout method, or post-treatment artificial lift method.”

- Reviewer: G-40-01A

- Rating: 3 (Average)

“Thank you for the feedback. I look forward to giving more insight into WOGC's candidate selection process in person.”

- Applicant

“The methodology outlined is straightforward and logical. Within the end product, the OGRC should request greater detail about criteria for WOGC's refrac candidate selection. The specific reasons that this well was chosen are well stated. The reasons that it was chosen OVER OTHER candidates is not as clearly stated... ”

- Reviewer: G-40-02B

- Rating: 4 (Above Average)

“Thank you for the feedback. I look forward to giving more insight into WOGC's candidate selection process in person.”

- Applicant

“No discussion of the types of diverter to be attempted.”

- Reviewer: G-40-01C

- Rating: 2 (Below Average)

“Thank you for the feedback. I look forward to giving more insight into WOGC's candidate selection process in person.”

- Applicant

4. The scientific and/or technical contribution of the proposed work to specifically address North Dakota Industrial Commission/Oil and Gas Research Council goals will likely be:
- “While it is a valid experiment, it is rather small in scope, and as per the researchers, is essentially cherry-picking for the initial candidate selection. Including the same review data and results for the remaining wells in the Whiting pilot study, for public access through the OGRP reports, even if no OGRP funds are used, would increase the statistical validity of the public information acquired from the initial re-fracturing attempt.”**
- Reviewer: G-40-01A**
- Rating: 3 (Significant)**
- “Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”**
- Applicant**
- “Refracs offer a huge opportunity for incremental Bakken reserve additions...”**
- Reviewer: G-40-02B**
- Rating: 4 (Very Significant)**
- “Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”**
- Applicant**
- “Has a huge potential for the state and industry.”**
- Reviewer: G-40-01C**
- Rating: 5 (Extremely Significant)**
- “Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”**
- Applicant**

5. The background of the principal investigator and the awareness of current research activity and published literature as evidenced by literature referenced and its interpretation and by the reference to unpublished research related to the proposal is:

“Detailed resumes of several contributors are included, but no information other than job title is included for the Principal Investigator, although a work title of Completions Manager, and a P. E. would infer reasonable knowledge of the processes involved in the project.”

- Reviewer: G-40-01A

- Rating: 3 (Adequate)

“Thank you for the feedback. I look forward to providing a detailed work history for myself.”

- Applicant

“The WOGC PI and balance of team is well qualified to perform the stated work. Diversifying the project team with engagement from other operators and/or researchers would likely yield greater penetration of anticipated results into the industry. ”

- Reviewer: G-40-02B

- Rating: 4 (Better Than Average)

“Thank you for the feedback. I look forward to providing a detailed work history for myself.”

- Applicant

“There are many peer reviewed papers on this subject, but none are referenced.”

- Reviewer: G-40-01C

- Rating: 3 (Adequate)

“Thank you for the feedback. I look forward to providing a detailed work history for myself.”

- Applicant

6. The project management plan, including a well-defined milestone chart, schedule, financial plan, and plan for communications among the investigators and subcontractors, if any, is:

“The milestone chart, schedule, financial plan, and plans for communication among the investigators, subcontractors, and ND OGRP is fairly detailed and typical of a workover of this type. There are a number of points in the schedule that could experience significant time and budget changes, but that is not atypical of any oil and gas well workover. It does appear project costs estimates have been submitted from very competitive sources, and as such, may contain significant upside cost risk. As mentioned before, to increase the value to the ND OGRP, and the public using the information reported, inclusion of data and results from Whiting's other planned re-fracturing candidates, in the final ND OGRP report, will increase the statistical validity of the conclusions.”

- Reviewer: G-40-01A

- Rating: 3 (Adequate)

“Thank you for the feedback. I look forward to discussing how the diverting agent will aid WOGC in contacting additional reservoir and reserves.”

- Applicant

“The project is straightforward, and certainly planned to very precise detail, as evidenced by the section entitled "Duration:" The project's initial refrac execution will likely be completed by the time OGRC funds are available. However, the observation period is really the most important portion of the proposed research.”

- Reviewer: G-40-02B

- Rating: 4 (Very Good)

“Thank you for the feedback. I look forward to discussing how the diverting agent will aid WOGC in contacting additional reservoir and reserves.”

- Applicant

“A very poor attempt at explaining of how exactly they plan on getting diversion to work. They did state their global objectives 3 times, but not enough specifics on the actual diversion process.”

- Reviewer: G-40-01C

- Rating: 3 (Adequate)

“Thank you for the feedback. I look forward to discussing how the diverting agent will aid WOGC in contacting additional reservoir and reserves.”

- Applicant

7. The proposed purchase of equipment and the facilities available is:
- “No equipment purchases are noted. Services are provided by vendors, and Whiting is the operator of the well and lease acreage. Some materials purchased for the fracturing treatment and artificial lift could use some elaboration, to substantiate choices and engineering design.”**
- Reviewer: G-40-01A**
- Rating: 3 (Justified)**
- “Thank you for the feedback.”**
- Applicant**
- “No equipment purchases were noted. The company's facilities/vendor capabilities are top notch.”**
- Reviewer: G-40-02B**
- Rating: 5 (Extremely Well Justified)**
- “Thank you for the feedback.”**
- Applicant**
- “”**
- Reviewer: G-40-01C**
- Rating: 3 (Justified)**
- “Thank you for the feedback.”**
- Applicant**

8. The proposed budget “value”¹ relative to the outlined work and the commitment from other sources is of:

“The estimated total project cost appears low, so the project may exceed budget, but this will only decrease the ND OGRP share of the total cost. Since this well is the only one in Whiting’s 10 well re-fracturing program, for which Whiting is requesting public funds, it would appear they are confident financial support is not necessary to warrant the program. In essence, ND OGRP funding could essentially be considered kick-start money for their re-fracturing program. In that framework, it is commendable that they are willing to provide the data to the public, and especially if they include the data and results of the remaining wells in the planned re-fracturing program. ”

- *Reviewer: G-40-01A*

- *Rating: 3 (Average Value)*

“Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”

- *Applicant*

“While the value is good, even greater value could be obtained by engaging other operators and/or researchers, as noted previously...”

- *Reviewer: G-40-02B*

- *Rating: 4 (High Value)*

“Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”

- *Applicant*

“”

- *Reviewer: G-40-01C*

- *Rating: 3 (Average Value)*

“Thank you for the feedback. I look forward to discussing how the scope of this project could possibly be expanded to include a larger statistical data set.”

- *Applicant*

9. The “financial commitment”² from other sources in terms of “match funding” have been identified:
“Requested ND OGRP funds are less than 50% of the estimated total project cost. Letters of support for the process are included from vendors and an oil and gas operator, but matching funds are provided by Whiting. In the event that well conditions would preclude completion of the project, before Whiting has exceeded 50% cost share, the funds would need to be returned to the program, or alternatively, consideration giving to applying the funds to another well with similar re-fracturing procedure.”
- *Reviewer: G-40-01A*
- *Rating: 3 (Average Value)*
“Thank you for the feedback.”
- *Applicant*
“The proposed project is funded at approximately 46% each NDIC and 54% from WOGC.”
- *Reviewer: G-40-02B*
- *Rating: 3 (Average Value)*
“Thank you for the feedback.”
- *Applicant*
“”
- *Reviewer: G-40-01C*
- *Rating: 3 (Average Value)*
“Thank you for the feedback.”
- *Applicant*

General Comments

“The program addresses a very real need for good data regarding re-fracturing stimulation in the Bakken and Three Forks.

The one well program, however, is very weak, from an experimental point of view. Increasing the sample size by including the data and results of the other planned wells in Whiting's re-fracturing program, in the final ND OGRP report, along with the same data and results of the ND OGRP funded well, would greatly increase the statistical validity of the study.”

- Reviewer: G-40-01A

“Refracs are an important next step in realizing Bakken resource potential. WOGC is a leader in the Williston Basin, and capturing their experience in the space provides a great opportunity to catalyze this step. At the same time, broader engagement and/or tech transfer efforts would be a logical item. Other operators' engagement would help broaden the geographical/geological understanding of this potential.”

- Reviewer: G-40-02B

“Diverters have been used for years. They need to define what secret sauce they are using to make this project better than the peer reviewed projects that have been completed. There is no indication that we will receive the data from the 9 subsequent re-fracs. It appears we are paying to see if their experiment works and if so, they will apply or tweak and apply the method we supported to other Whiting wells without the state receiving the benefit of the additional data.

Although based on the ratings, funding may be considered, I would not fund without data from all 10 re-fracs in the package, more details on the diversion process, equipment and chemicals used in the diversion and more peer reviewed papers referenced.

This has a potentially huge impact on the state and the industry. It has to be done correctly.”

- Reviewer: G-40-01C

1 “value” – The value of the projected work and technical outcome for the budgeted amount of the project, based on your estimate of what the work might cost in research settings with which you are familiar. A commitment of support from industry partners equates to a higher value.

2 “financial commitment” from other sources – A minimum of 50% of the total project must come from other sources to meet the program guidelines. Support less than 50% from Industrial Commission sources should be evaluated as favorable to the application; industry partnerships equates to increased favorability.